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1903

CARBIDE AND CARBON CHEMICALS CORPORATION
UNIT OF UNION CARBIDE AND CARBON CORPORATION

UCC

POST OFFICE BOX P
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KZ-

REPORT NO.
KZ 3749

January 16, 1947

KZ 3749   4 A

KZ 3749   4 A

U. S. Atomic Energy Commission
P. O. Box E
Oak Ridge, Tennessee

Plant Records Department Vault	
Doc. No.	
Serial No.	
File No.	

Attention: Lt. Col. R. W. Cook

Dear Sir:

Attached for your approval is a report recommending limits
to be used in discarding contaminated waste solutions and spent
carbon. Contaminated material with concentrations less than those
stated cannot be economically recovered. If economy is of
secondary importance, approval is desired for the adoption of
other limits specified by the Atomic Energy Commission. It is
planned to discard the material into the concrete pit east of
K-1401 with due regard to special hazards problems and proper
accounting.

Discarding certain contaminated material will greatly
simplify storage, handling, and recovery problems and will aid in
material accounting.

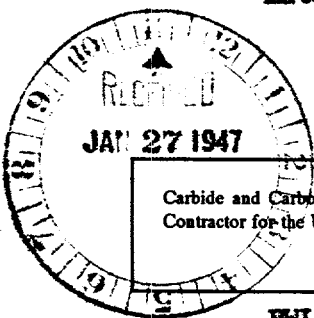Very truly yours,

CARBIDE AND CARBON CHEMICALS CORPORATION

C. N. Rucker, Jr.
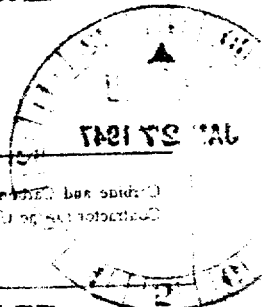
RWL/jw
Attachment:
cc: Mr. C. E. Center
    Mr. G. T. E. Sheldon
    File

Recommended Limits for Discarding Contaminated Wastes at K-25

Purpose:

It is the purpose of this report to establish concentration limits, based on stated assumptions, for discarding contaminated solutions and contaminated carbon.

PART I: CONTAMINATED SOLUTIONS

> REPORT NO.
> KZ 3749

1. Procedure:

The cost of handling and recovery of contaminated solutions will be equated to the value of the contained "T" at the corresponding X-assay. The concentration of "T" in the solution at which the solution handling and recovery cost is equal to or less than the value of the contained "T" is computed.

2. Production Costs:

A curve relating the cost of "T" to enrichment has been prepared by the Theoretical Analysis Department. This curve was obtained by evaluating "T" at any concentration by finding the loss or gain at present product concentration when "T" is removed or added to the cascade.

3. Recovery Costs:

Cost of recovery figures are taken from a report to Mr. L. L. Anthony, Jr., by Mr. J. H. Julien, October 30, 1946.

These are:

TABLE I

Class	A	B	C	D	E
Recovery Cost of Contaminated Solution, dollars per gallon	4.05	3.23	1.64	1.39	1.26
Upper Limit, wt. % X	3320301	2293304	1332509	6939104	2797000

4. Solution Discard Limits:

Figure No. 1 shows at which concentrations the value of "T" recovered from contaminated solutions equals the cost of recovery. Below these concentrations, the cost of recovery exceeds the value of the material recovered.

The given limits are based on the previously given production and recovery costs.

5. <u>Estimated Volume of Discard</u>:

<u>TABLE II</u>

Class	Class Median X-Assay Wt. %	Solution Inventory Pounds of "T"	"T"-Value Dollars/ Pounds	Total Value Dollars	Solution Inventory Gallons	Recovery Cost Dollars/ Gallons	Total Recovery Cost Dollars
A	1127502	460	15	6,900	9,270	4.05	37,600
B	2251802	115	440	50,600	10,380	3.23	33,500
C	3427903	12	1725	20,700	3,670	1.64	6,000
D	4650803	25	4090	102,500	4,900	1.39	6,800
E	1598005	5	9110	45,500	760	1.26	950

The above class inventories, both in pounds of "T" and gallons of solution, are based on an approximate October 1, 1946 inventory.

The value of the "T" in the classes is estimated by the median X-assay of the class upper and lower limit X-assay.

It is estimated that nearly all of Class A and about 50% of the Class B contaminated solutions consist of filtrates and washings of "T" concentrations below the minimum concentrations given in Table II for these classes and may therefore be discarded as uneconomical to recover.

The following table indicates the portion of the contaminated solutions formed by Class A and 50% of Class B:

<u>TABLE III</u>

	Gallons	No. of Containers	Pounds "T"	Ave. Wt. % X
Class A and 50% Class B	14,400	350	516	3329702
All Classes	28,000	700	616	4455903

PART II: CONTAMINATED CARBON

1. **Procedure:**

The cost of handling and recovery of contaminated carbon will be equated to the value of the contained "T" at the corresponding X-assay. The concentration of "T" in the contaminated carbon at which the cost of handling and recovery is equal to or less than the value of the contained "T" is computed.

2. **Production Costs:**

The same production costs assumed in "Part I, Contaminated Solutions" are used.

3. **Recovery Costs:**

Costs of recovery figures are taken from a report to Mr. F. H. Anderson by Mr. J. H. Julian.

These are:

TABLE IV

Class	A	B
Recovery Cost of Contaminated Carbon, dollars per pound	4.83	2.44
Upper limit, Wt. % X	3320301	2293304

Information on recovery costs for classes C, D, and E are not available at this date.

4. **Carbon Mixtures Discard Limits:**

The following table shows at which concentrations the value of "T" recovered from contaminated carbon equals the cost of recovery. Below these concentrations, the cost of recovery exceeds the value of the material recovered.

TABLE V

Class of Material	Wt. % X in T (Class Upper Limit)	Wt. % T in Mixture
A	8837203	100
A	3320301	11.83
B	2293304	0.30

The above figures are examples. It will be necessary to calculate more detailed tables for individual drum discarding.

5. **Estimated Volume of Discard:**

TABLE VI

Class	Class Median X-Assay Wt. %	Inventory pounds of Mix	Inventory pounds of "T"	Value of "T" dollars/ pounds	Total Value dollars	Recovery Cost dollars/ pounds	Total Recovery Cost dollars
A	1127502	200,000	19,000	15	285,000	4.83	966,000.
B	2251802	29,000	450	440	198,000	2.44	70,800
C	3427903	275	14	1725	24,100	—	—
D	4650803	550	1	4090	4,100	—	—
E	1598005	400	—	9110	—	—	—

The above class inventories are based on an approximate November 1, 1946 inventory. The value of "T" in each class is estimated by the median X-assay of the class upper and lower limit X-assay.

About 95% of the Class A contaminated carbon contains "T" of feed concentration or lower, and is uneconomical to recover.

The following table indicates the portion of the total contaminated carbon mixtures formed by 95% of Class A.

TABLE VII

	Pounds Mixture	No. of Drums	Pounds "T"	Ave. Wt. % X
Class A	190,000	525	18,750	4416021
All Classes	230,000	635	19,475	5526412

This report reviewed and approved by the Process Materials Department Council:

F. E. Anderson
E. D. Flickinger
A. de la Garza
A. M. Tuholsky
R. W. Levin, Chairman
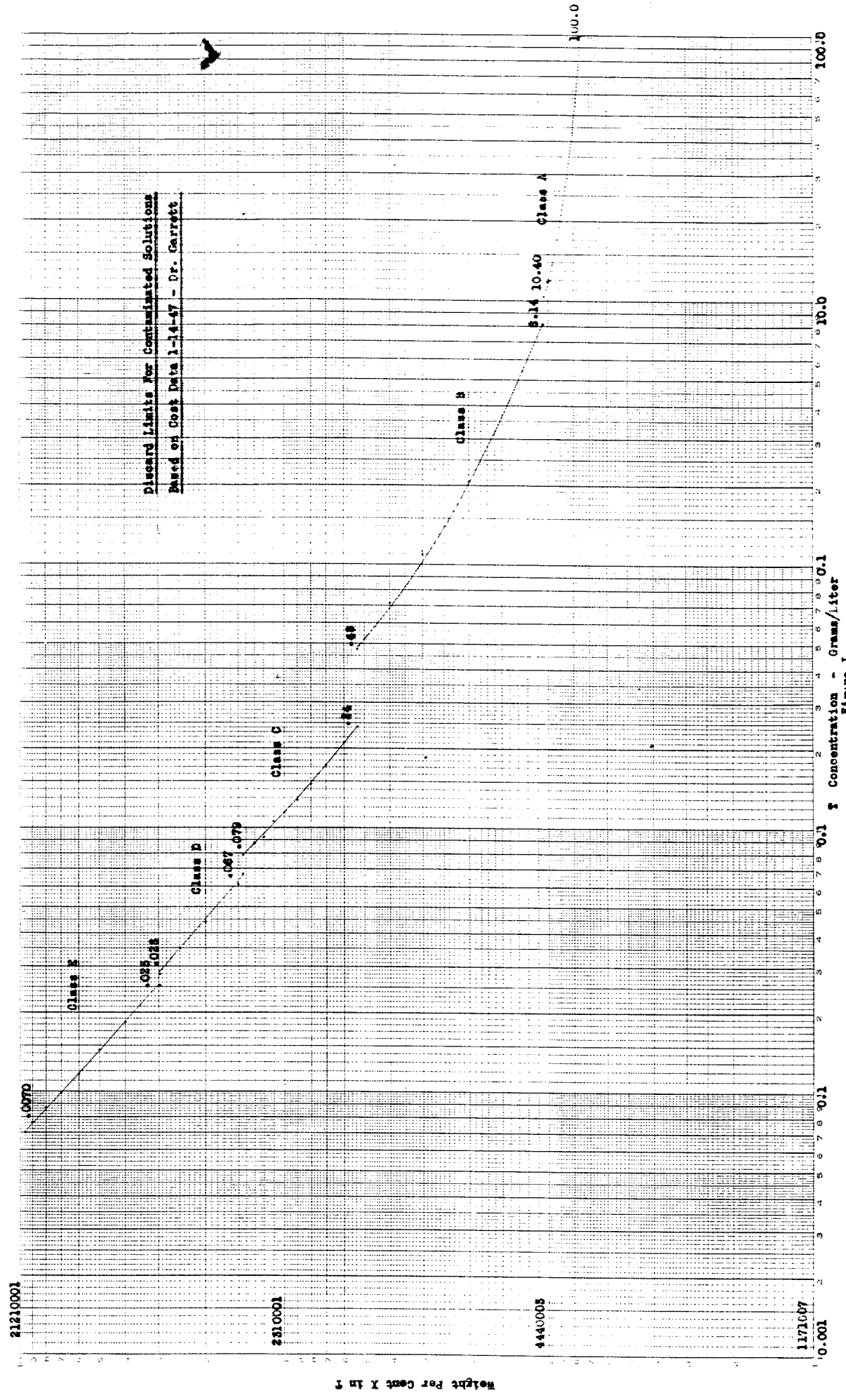
Prepared by:

N. Gerber
J. I. Cokin

RL/jw

Discard Limits for Contaminated Solutions
Based on Cost Data 1-14-47 - Dr. Garrett

Class E

.025 .028

Class D
.067 .079

Class C
.14

Class B
.48

Class A
5.14 10.40

100.0

Weight Per Cent X in T

% Concentration - Grams/Liter

Figure 1